

WE CLAIM:

1 1. A method of interactively designing a user
2 interface comprising:
3 receiving a domain model, a user model, a task
4 model, and a device model, wherein the domain model
5 characterizes an application for which the user interface
6 is to be used, wherein the user model characterizes users
7 who are to interface with the user interface, wherein the
8 task model characterizes tasks to be performed between
9 the user interface and the users, and wherein the device
10 model characterizes interaction delivery devices that are
11 available to deliver the user interface; and,
12 matching characteristics in the domain model,
13 the user model, the task model, and the device model so
14 as to construct the user interface.

1 2. The method of claim 1 wherein the matching
2 of characteristics comprises forming an intersection
3 between the domain model, the user model, the task model,
4 and the device model.

1 3. The method of claim 1 wherein the matching
2 of characteristics comprises:

3 matching the interaction delivery devices to
4 information requirements defined in the tasks model and
5 to the users defined in the user models to identify
6 interaction delivery devices that support the information
7 requirements and the users; and,

8 matching presentation elements to task
9 primitives of the task model and to characteristics
10 provided in the domain model to identify presentation
11 elements that support the task primitives and the domain
12 characteristics, wherein the presentation elements
13 comprise display objects.

1 4. The method of claim 3 wherein the matching
2 of characteristics comprises creating a presentation for
3 each identified presentation element and a matching one
4 of the identified interaction delivery devices.

1 5. The method of claim 4 wherein the matching
2 of characteristics comprises scoring and sorting the
3 presentations, and wherein the matching of
4 characteristics comprises selecting the presentations
5 having the best scores.

1 6. The method of claim 5 wherein the matching
2 of characteristics comprises generating the user
3 interface based on the selected presentations.

1 7. The method of claim 5 wherein the
2 selecting of the presentations comprises selecting the
3 presentations having the best scores for all interactions
4 between the users and the user interface.

1 8. The method of claim 7 wherein the matching
2 of characteristics comprises generating the user
3 interface based on the selected presentations.

1 9. The method of claim 4 wherein the matching
2 of characteristics comprises generating the user
3 interface based on the presentations.

1 10. A method of interactively designing a user
2 interface comprising:
3 creating a domain model, wherein the domain
4 model contains information characterizing a designer
5 selected application in a designed selected domain;

6 creating a user model, wherein the user model
7 contains information characterizing users of the user
8 interface;
9 creating a task model, wherein the task model
10 contains task primitives to be performed between the user
11 and the user interface, and wherein the task model also
12 contains types of information required by the task
13 primitives;
14 creating a device model, wherein the device
15 model contains information characterizing interaction
16 delivery devices that are available to deliver the user
17 interface; and,
18 matching the information contained in the
19 domain model, the user model, and the task model to the
20 information contained in the device model and to
21 presentation elements contained in a presentation
22 elements so as to construct the user interface, wherein
23 the presentation elements comprise objects of the user
24 interface that present information to the user.

1 11. The method of claim 10 wherein the domain
2 model, the user model, the task model, and the device
3 model are created using a consistent notation.

1 12. The method of claim 11 wherein the
2 notation adheres to the Resource Description Framework
3 specification or other specific knowledge technology
4 notations.

1 13. The method of claim 10 wherein the domain
2 model, the user model, the task model, and the device
3 model are stored in a computer readable memory.

1 14. The method of claim 10 wherein the
2 matching of the information comprises forming an
3 intersection between the presentation elements and the
4 information contained in the domain model, the user
5 model, the task model, the device model, and the
6 presentation elements library.

1 15. The method of claim 10 wherein the
2 matching of the information comprises:
3 matching the interaction delivery devices to
4 the type of information required of the task primitives
5 and to the information characterizing the users so as to
6 identify interaction delivery devices that support the
7 information requirements and the users; and,
8 matching the presentation elements to the task
9 primitives and to the information characterizing the
10 designer selected application in the designer selected
11 domain so as to identify presentation elements that
12 support the task primitives and the domain information.

1 16. The method of claim 15 wherein the
2 matching of the information comprises creating a
3 presentation for each identified presentation element
4 that matches at least one of the identified interaction
5 delivery devices.

1 17. The method of claim 16 wherein the
2 matching of the information comprises scoring and sorting
3 the presentations, and wherein the matching of the
4 information comprises selecting the presentations having
5 the best scores.

1 18. The method of claim 17 wherein the
2 matching of the information comprises generating the user
3 interface based on the selected presentations.

1 19. The method of claim 17 wherein the
2 selecting of the presentations comprises selecting the
3 presentations having the best scores for all interactions
4 to be performed by the user interface.

1 20. The method of claim 19 wherein the
2 matching of the information comprises generating the user
3 interface based on the selected presentations.

1 21. The method of claim 10 wherein the domain
2 model, the user model, the task model, and the device
3 model are created using a consistent notation, and
4 wherein the matching of the information comprises:
5 matching the interaction delivery devices to
6 the information required of the task primitives and to
7 the information characterizing the users so as to
8 identify interaction delivery devices that support the
9 information requirements and the users; and,
10 matching the presentation elements to the task
11 primitives and to the information characterizing a
12 specific application in a specific domain so as to
13 identify presentation elements that support the task
14 primitives and the domain information.

1 22. The method of claim 21 wherein the
2 matching of the information comprises creating
3 presentations, and wherein each presentation comprises a
4 matching pair of one of the presentation elements and one
5 of the interaction delivery devices.

1 23. The method of claim 22 wherein the
2 matching of characteristics comprises selecting one of

3 the presentations for each interaction to be performed
4 between the user interface and the users.

1 24. A method of interactively designing a user
2 interface comprising:

3 storing a domain model in a computer readable
4 memory, wherein the domain model contains information
5 characterizing data, concepts, and relations of an
6 application in a domain as specified by a designer;

7 storing a user model in the computer readable
8 memory, wherein the user model contains information
9 characterizing roles and preferences of users of the user
10 interface;

11 storing a task model in the computer readable
12 memory, wherein the task model contains task primitives
13 to be performed between the user and the user interface,
14 type of information required of the task primitives, and
15 sequences of the task primitives;

16 storing a device model in the computer readable
17 memory, wherein the device model contains information
18 including modality characterizing interaction delivery
19 devices that are available to deliver the user interface;

20 matching the interaction delivery devices in
21 the device model to the type of information required of
22 the task primitives and to the information characterizing
23 the users so as to identify interaction delivery devices
24 that support the information requirements and the users;
25 matching presentation elements to the task
26 primitives and to the data, concepts, and relations of
27 the domain model so as to identify ones of the
28 presentation elements that support the task primitives
29 and the data, concepts, and relations of the domain
30 model; and,
31 generating the user interface based on the
32 identified interaction delivery device and the identified
33 presentation elements.

1 25. The method of claim 24 wherein the
2 generating of the user interface comprises creating
3 presentations between matching ones of the identified
4 presentation elements and ones of the identified
5 interaction delivery devices.

1 26. The method of claim 25 wherein the
2 generating of the user interface comprises scoring and
3 sorting the presentations, and wherein the generating of

4 the user interface comprises selecting the presentations
5 having the best scores.

1 27. The method of claim 26 wherein the
2 generating of the user interface comprises generating the
3 user interface based on the selected presentations.

1 28. The method of claim 26 wherein the
2 selecting of the presentations comprises selecting the
3 presentations having the best scores for all interactions
4 to be performed by the user interface.

1 29. The method of claim 28 wherein the
2 generating of the user interface comprises generating the
3 user interface based on the selected presentations.

1 30. The method of claim 29 further comprising
2 creating the domain model, the user model, the task
3 model, and the device model using a consistent notation.

1 31. The method of claim 30 wherein the
2 notation adheres to the Resource Description Framework
3 specification or other specific knowledge technology
4 notations.

1 32. The method of claim 30 wherein the
2 generating of the user interface comprises creating
3 presentations between matching ones of the identified
4 presentation elements and the identified interaction
5 delivery devices.

1 33. The method of claim 32 wherein the
2 generating of the user interface comprises selecting one
3 of the presentations for each interaction to be performed
4 between the user interface and the users.

1 34. The method of claim 33 wherein the
2 generating of the user interface comprises generating the
3 user interface based on the selected presentations.

1 35. The method of claim 24 wherein the
2 generating of the user interface comprises creating
3 presentations between matching ones of the identified
4 presentation elements and the identified interaction
5 delivery devices.

1 36. The method of claim 35 wherein the
2 generating of the user interface comprises selecting one

3 of the presentations for each interaction to be performed
4 between the user interface and the users.

1 37. The method of claim 36 wherein the
2 generating of the user interface comprises generating the
3 user interface based on the selected presentations.

1 38. A method of interactively designing a
2 system comprising:
3 storing a domain model, a user model, a task
4 model, and a device model in a computer readable memory,
5 wherein the domain model characterizes an application for
6 which the system is to be used, wherein the user model
7 characterizes a user who is to use the system, wherein
8 the task model characterizes tasks to be performed
9 between the system and the user, and wherein the device
10 model characterizes devices to support the system; and,
11 matching characteristics in the domain model,
12 the user model, the task model, and the device model so
13 as to construct the system.

1 39. The method of claim 38 wherein the
2 matching of characteristics comprises forming an

3 intersection between the domain model, the user model,
4 the task model, and the device model.

1 40. The method of claim 39 further comprising
2 creating the domain model, the user model, the task
3 model, and the device model using a consistent notation.

1 41. The method of claim 40 wherein the
2 notation adheres to the Resource Description Framework
3 specification or other specific knowledge technology
4 notations.